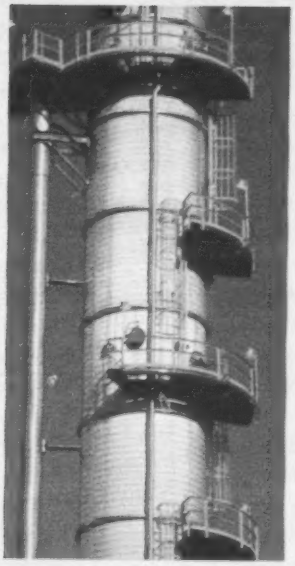
ALBERTA OIL & GAS INDUSTRY QUARTERLY UPDATE



SUMMER 2015

Reporting on the period: April 1, 2015 to June 19, 2015

All about oil and gas

While Alberta and its petroleum sector has endured the hurt of sinking world crude oil prices and continued weak natural gas prices, the province is well positioned to rebound once the cyclical nature of commodity prices eventually recalibrates.

In fact, technological advancement has set the stage for another boom in Alberta's non-oil sands oil and natural gas industry. Until the turn of the last decade, the sun had slowly been setting on Alberta's conventional oil and natural gas industry. Oil production had declined from a peak of 1.43 million barrels per day (bbls/d) in 1973 to a low of around 460,000 bbls/d in 2010.

TABLE OF CONTENTS

3 **Oil plays**

4 **Natural gas plays**

5 **Government update**

7 **What's new in the oil and gas industry**

9 **Technology update**

10 **Labour update**

11 **Oil and gas statistics**

14 **Focus on the Duvernay**

16 **Contacts**

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But things have changed for the better, as increased implementation of long, horizontal wells and multistage fracturing in tight oil plays across the province—not to mention improved provincial royalty incentives to encourage drilling—has crude oil drilling activity and production on the upswing.

In fact, the tight oil revolution that began in the U.S. gradually moved north into Alberta, marking the dawning of a new day for oil and natural gas exploration and production in the province.

In Alberta, the technology is being used in an increasing number of oil plays. Among the most advanced plays are the Cardium in west-central Alberta, the Beaverhill Lake Carbonates near Swan Hills and the Viking in east-central Alberta.

More importantly, emerging liquids-rich plays like the Montney and Duvernay shale show great promise. In fact, the Duvernay play may have the most potential going forward.

At the end of 2014, industry giants such as Chevron Canada and Encana reported strong liquids yields, particularly for valuable condensate, and producers are preparing to ramp up activity this year.

The Duvernay is often compared to the prolific Eagle Ford of Texas because they are both shale plays that offer a full spectrum, from dry gas through liquids-rich gas to oil. Many other shale plays, such as the Horn River Basin in B.C. and the Marcellus or Barnett south of the border, are much more gas-focused.

In terms of the potential size of the play area, the richness of the source rock and even some of the early production results, the Duvernay "is well on its way to being as big or bigger than the Eagle Ford," Canadian Discovery has proclaimed.

The increase in horizontal drilling activity is expected to offset the steep decline in Alberta conventional production that would otherwise be expected.

The Alberta Energy Regulator estimates the remaining total established reserves of conventional crude oil in Alberta to be 1.8 billion barrels, representing about one-third of Canada's remaining conventional reserves. This is a year-over-year increase from 2012 of five per cent, resulting from all reserve adjustments less production in 2013.

Alberta's production of conventional crude oil totalled 213 million barrels in 2013, an increase of five per cent.

The province is also the largest contributor to Canadian oil and equivalent production and is the only contributor of upgraded and non-upgraded bitumen, which are the marketed components of raw bitumen production.

Alberta is Canada's largest producer of marketable natural gas. In 2013, Alberta produced 69 per cent of Canada's total production, down from 70 per cent in 2012. Over the same period, Canada's second-largest contributor, B.C., increased its share from 25 per cent to 26 per cent.

Canada is the third-largest natural gas producer in the world, with the majority of the country's gas being produced in Alberta. According to provincial figures, at the end of 2012, remaining established reserves of conventional natural gas stood at 33 trillion cubic feet (tcf), while remaining established coalbed methane gas reserves stood at 2.4 tcf. The province estimates the remaining ultimate potential of marketable conventional natural gas at 74 tcf.

Although conventional natural gas remains a very important part of Alberta's natural gas supply, horizontal drilling and multistage fracturing now allow for development of natural gas from a new source—unconventional natural gas resources. ■

NOTE: This publication contains information about Alberta's oil and gas industry, excluding the oil sands. For information on the oil sands, please refer to the *Alberta Oil Sands Industry Quarterly Update* on this website.

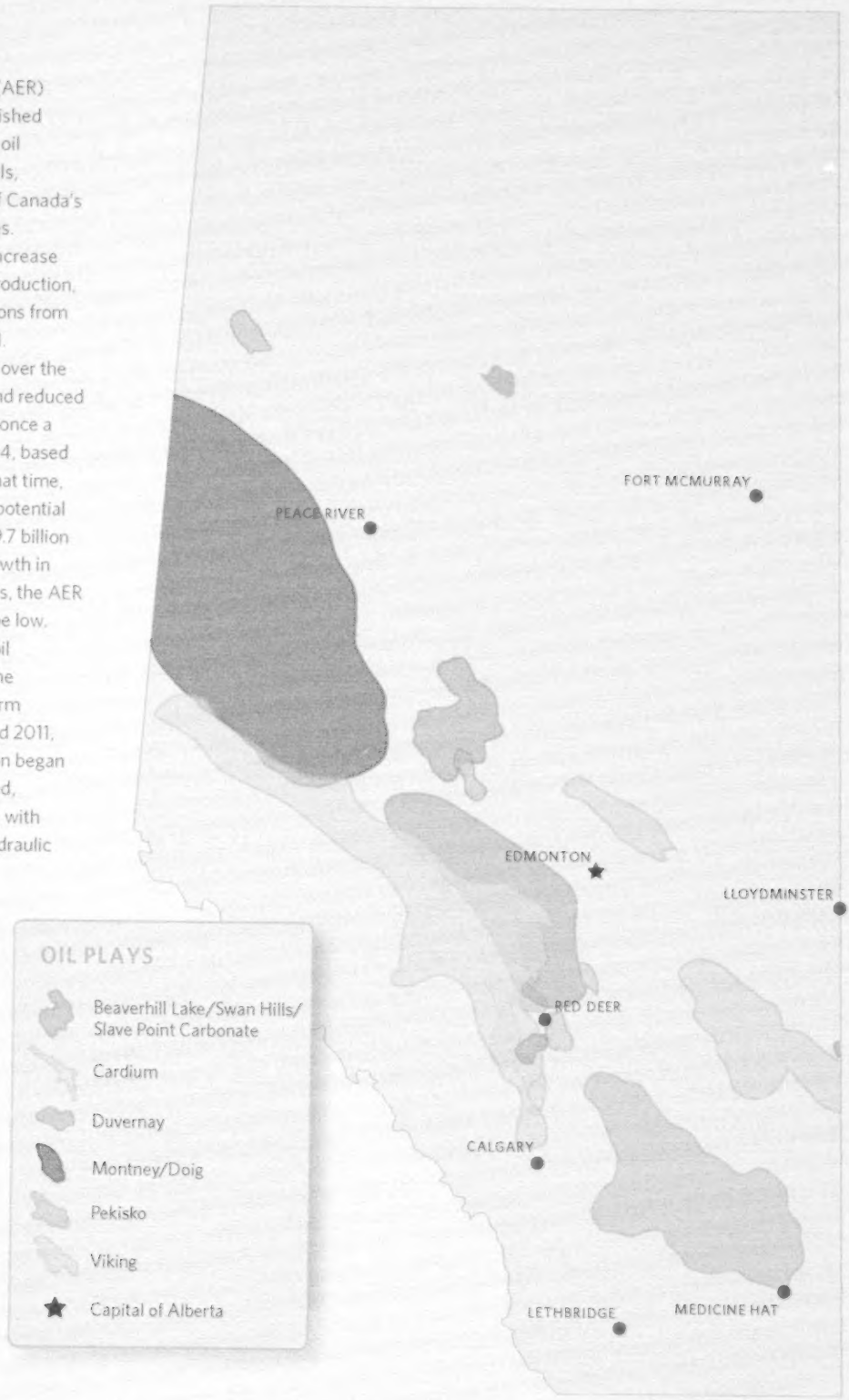
OIL PLAYS

The Alberta Energy Regulator (AER) estimates the remaining established reserves of conventional crude oil in Alberta to be 1.7 billion barrels, representing about one-third of Canada's remaining conventional reserves.

This was a year-over-year increase of 9.5 per cent, resulting from production, reserves adjustments and additions from drilling that occurred during 2011.

Though the pace has slowed over the past year due to low oil prices and reduced activity, it's expected to resume once a market correction occurs. In 1994, based on the geological prospects at that time, the AER estimated the ultimate potential of conventional crude oil to be 19.7 billion barrels. Given recent reserve growth in low permeability, or tight oil plays, the AER believes that this estimate may be low.

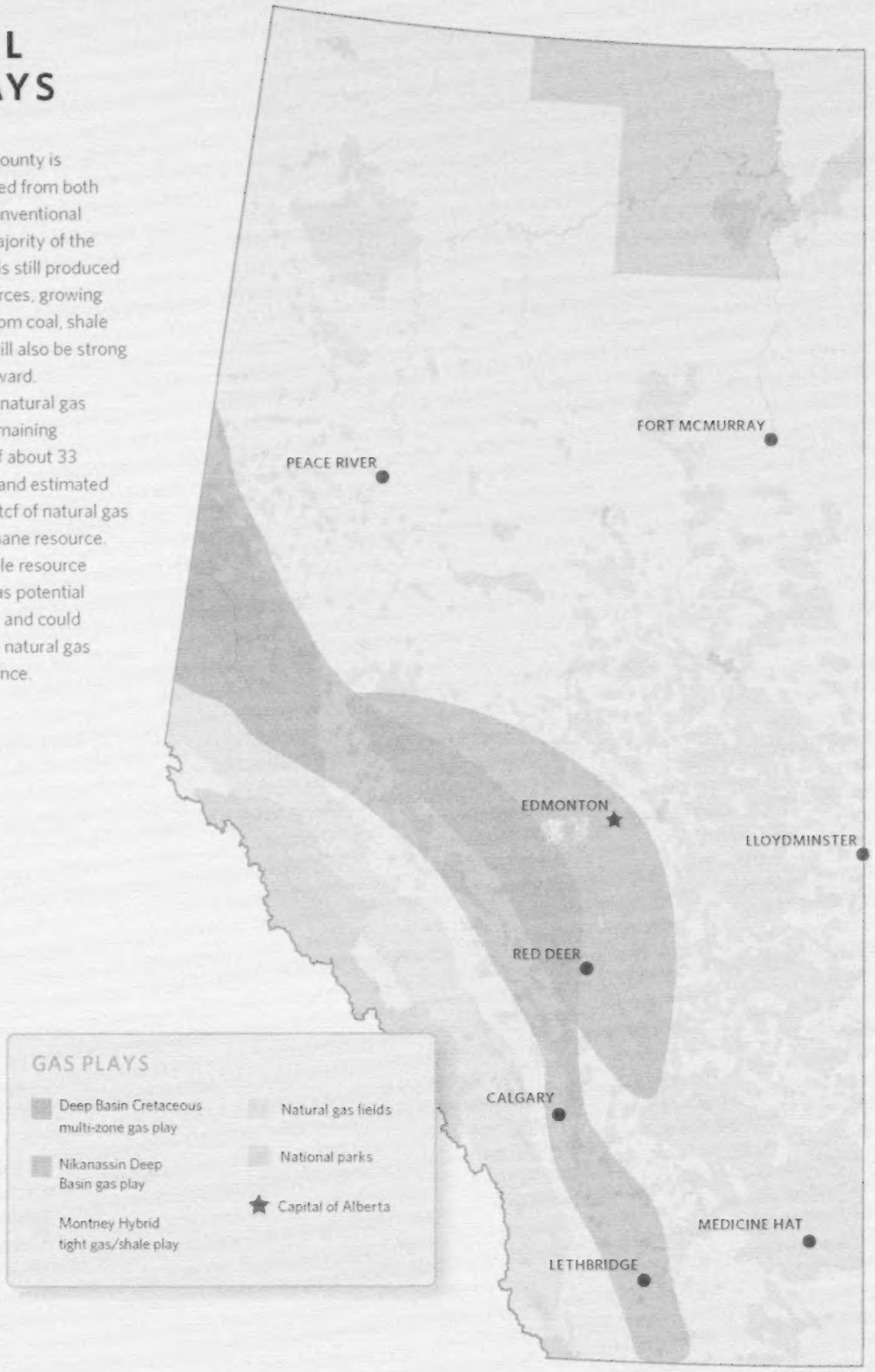
Starting in 2010, total crude oil production in Alberta reversed the downward trend that was the norm since the early 1970s. In 2010 and 2011, light-medium crude oil production began to increase as a result of increased, mainly horizontal, drilling activity with the introduction of multistage hydraulic fracturing technology.



NATURAL GAS PLAYS

Alberta's natural gas bounty is plentiful and is produced from both conventional and unconventional reserves. While the majority of the province's natural gas is still produced from conventional sources, growing natural gas volumes from coal, shale and tight formations will also be strong contributors going forward.

Alberta has a large natural gas resource base, with remaining established reserves of about 33 trillion cubic feet (tcf) and estimated potential of up to 500 tcf of natural gas from the coalbed methane resource. In addition, a large-scale resource assessment of shale gas potential in Alberta is underway and could significantly add to the natural gas prospects for the province.



GOVERNMENT UPDATE

Alberta Government

A NEW CHAPTER IN THE STORY OF ALBERTA

Alberta's 17th premier, the Honourable Rachel Notley, and her cabinet, were sworn in on the steps of the Alberta Legislature on May 24.

Albertans have chosen a strong, stable majority government that will put the priorities of Albertans first—a government that shares in the very same values that built this province and our prosperity.

"Today, we open a new chapter in the story of Alberta. From our earliest days, Albertans have worked as hard as anyone to forge a brighter future," said Premier Notley. "People from all walks of life and from every part of the world have joined together on a common journey. And on that journey we've been guided by enduring values. Albertans are hard working. We are entrepreneurial. And we are relentlessly optimistic. We believe that tomorrow can be a better day. And that we must work hard to make it happen. That's who we are as Albertans."

The new cabinet is lean and efficient, and is firmly focused on solving the challenges that face Alberta. The newly sworn-in ministers will partner with Alberta's job creators—in energy, forestry, agriculture, high-tech, tourism and small business—to grow and diversify our economy.

PREMIER NOTLEY COMMITTED TO THOUGHTFUL, TRANSPARENT OIL AND GAS ROYALTY REVIEW

Alberta's new government is committed to implementing policies that provide competitive, realistic oil and gas royalty rates to ensure full and fair value for Albertans as owners of the resources. This will require a comprehensive review of the current oil and gas royalty structure.

While full details are forthcoming, Premier Notley is determined to execute the process in a conscious and transparent manner.

She said, "We have committed to a review, and as part of that I have committed that it will be thoughtful, well informed, and all parties to it will have a clear understanding of what the process itself entails before it unfolds."

MINISTER OF ENVIRONMENT AND PARKS SHANNON PHILLIPS PROMISES NEW CLIMATE CHANGE REGULATIONS WILL BE IN PLACE BY THE END OF JUNE

On June 30, 2015, Alberta has four climate change regulations that are set to expire, including the Specified Gas Emitters Regulation. This legislation, which falls under the Climate Change and Emissions Management Act, was established in 2007 as the first greenhouse gas regulation and compliance carbon pricing system.

Environment and Parks Minister Shannon Phillips has committed that new regulations will be in place before current regulations expire.

"This government will take leadership on the issue of climate change and make sure Alberta is part of crafting solutions with stakeholders, other provinces and the federal government," she said.

Phillips also committed to a broad consultation that will take place over the next few months. First steps will include an energy efficiency strategy and a renewable energy strategy. ➤

GOVERNMENT UPDATE CONTINUED

ENERGY MINISTER MARG MCCUAIG-BOYD WELCOMES ATTENDEES TO THE GLOBAL PETROLEUM SHOW

In mid-June, Minister of Energy Marg McCuaig-Boyd provided the keynote address at the welcome reception for this year's Global Petroleum Show (GPS) in Calgary. GPS is an annual event that hosts 95 countries, 63,000 attendees and 2,000 exhibiting companies. Minister McCuaig-Boyd stated:

"Alberta's service, manufacturing and technology companies are among the most forward-thinking in the world, with a lot to offer the industry when it comes to innovative gas and oil development, clean technologies and environmental management. That's the kind of thinking we want to encourage, and that's the focus you can expect from our government's approach to resource development.

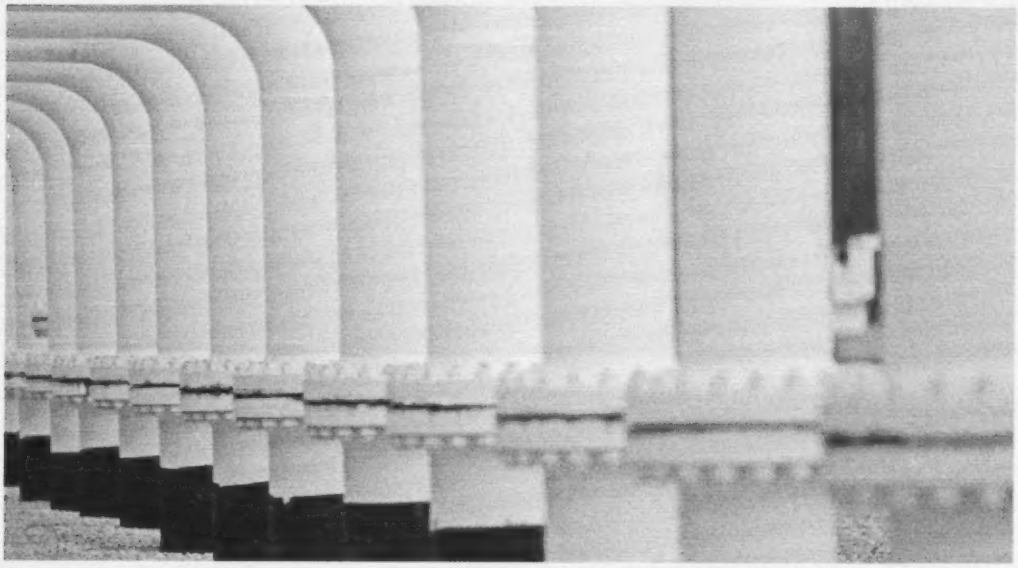
"For those of you who work and invest in the energy industry, there is obviously some uncertainty in the sector due to the drop in oil prices. At the same time, our province has just undergone a change in government, and there is no denying that change at the top after so long is challenging. But we are working hard to make the transition as smooth as possible to bring stability to the economy as we can and implement our plans.

"At the heart of those plans is our promise to Albertans to increase prosperity, to create opportunities for good jobs [and] to build a diversified economy that benefits everyone. This is one way and the only way to succeed.

"Job creators create jobs in the private sector, not government, but we aim to be good partners. Alberta is and will always be a healthy place for private investment under our government; home to a wide range of enterprises and rewarding jobs.

"Quite a lot of these opportunities in Alberta are in the energy sector, which has been a strong driver of provincial and national growth for many years. And under our new government and the leadership of Premier Notley, Alberta will continue to welcome the energy business. We simply want to do it right by developing the province's rich reserves in a manner that is fair to the resource owners—Albertans themselves—and to companies that extract the energy and deserve a reasonable return for their investments. And we want to accomplish all of this as sustainably as possible so that we can protect our environment for generations to come.

"I consider industry to be government's partner in achieving these goals and I want you to know that this government will be an honest, thoughtful partner to the energy sector as we move forward. We are very excited to work together with your industry." ■



WHAT'S NEW IN THE OIL & GAS INDUSTRY

PREMIER WILL NOT RULE OUT CHANGES IN GREENHOUSE GAS RULES, ROYALTIES

Premier Rachel Notley has reiterated her government's commitment to take a "thoughtful, considered, intelligent approach" to issues such as greenhouse gas emissions and a royalty review with "a great deal of consultation and a great deal of dialogue."

However, she was steadfast that changes are coming.

"To suggest that we never change anything ever, ever, ever going forward I don't think is particularly responsible given the pressures being faced by industry as a result of the world-wide conversations around climate change," Notley told reporters May 27 in Calgary, where her new cabinet was holding its first full meeting.

"As a government, we have an obligation to the people of this province to periodically test to make sure that we are doing the best we can for them in terms of our royalty regime," she added.

Marg McCuaig-Boyd, energy minister, added that the government plans to launch its royalty review within six months.

Notley was reacting to comments by Canadian Natural that, due to the current uncertainty surrounding the Alberta government's review of royalty, taxation, environmental and greenhouse gas policies, it could not finalize detailed future capital allocation plans for its assets.

As a result, Canadian Natural said it was deferring its annual investor day, which was to have been held in June.

The premier, though, suggested that there are lots of people, including other leaders in the oil and gas industry, who believe that the uncertainty resulting from failing to deal with issues such as climate change also is a concern.

"We have outlined a mechanism that includes transparency, consultation, [and] a careful considered approach that takes into account the fulsome contribution of our industry partners," she said. "I think that is a responsible and reasonable way to go forward."

Notley said that her government will not be rushed into decisions, noting that "rushed decisions can be bad decisions."

INDUSTRY GROUP PREPARED TO WORK WITH NEW PROVINCIAL GOVERNMENT

The oil and natural gas industry is looking forward to working with the new Alberta government to protect and grow jobs and investment in the province and all of Canada.

"Albertans voted for change and we are prepared to work with the new government to explore and embrace the best change possible," Tim McMillan, Canadian Association of Petroleum Producers (CAPP) president, said in a news release. "CAPP will form an industry group to work with Premier Rachel Notley and her team on priorities to make the industry stronger, because a strong oil and gas industry makes for a strong Alberta."

McMillan said the industry and the government share a common interest in industry success and "the best way to protect jobs and investment is through improved market access—building new pipeline, rail and marine transportation infrastructure—while maintaining a strong fiscal regime that allows the industry to compete in the global market.

"Improved market access and fiscal strength will allow Canada to reap the benefits of helping meet global energy needs through safe, responsible development and delivery of its natural resources," he added.

With a 50 per cent drop in global oil prices since last summer, these are challenging times and Canadians across the country are feeling the impacts of reduced oil and gas industry activity, CAPP noted.

Oil and gas industry capital investment is forecast to be down $23 billion. As spending declines, industry unemployment rises. To date, companies have announced more than 4,500 layoffs, with an additional 23,000 jobs lost as a result of lower drilling activity.

"To grow the oil and gas industry—creating more jobs and increasing public revenues to improve our quality of life—we must continue to keep Alberta and all of Canada attractive for oil and gas investment," McMillan said.

REGULATORS AGREE TO COLLABORATE

Energy regulators from three western Canadian provinces and the National Energy Board (NEB) have agreed to collaborate in specific regulatory areas, including exploring a one-window approach in communicating pipeline safety indicators, an NEB forum on pipeline safety heard in early June.

"Every one of the regulators has a different reporting threshold, and some of us also have different types of incidents, so getting some consistency is important," said Chris Loewen, vice-president of operations for the NEB. ➤

WHAT'S NEW IN THE OIL & GAS INDUSTRY CONTINUED

"We have four different regulatory bodies and four very different sets of rules and if you are a pipeline company specifically, chances are you are dealing with all four of us, maybe on one pipeline," Mark Taylor, vice-president of industry operations at the Alberta Energy Regulator (AER), said in an update on the Western Regulators Forum, which includes the AER, the NEB, the British Columbia Oil and Gas Commission and the Saskatchewan Ministry of the Economy.

"The whole point is to come up with some wins by focusing on areas where we can make a difference to the regulatory framework."

Within the forum, the regulators have been working collectively with the Canadian Standards Association, drafting some new guidelines on fugitive emissions and venting that should be coming out this summer for public consultation, he said.

The group also is looking at developing a common approach to addressing public concerns when it comes to air quality, said Taylor. "Right now it's kind of a shotgun approach depending upon where the complaints come from," he said.

ALBERTA COULD BENEFIT FROM VALUE-ADDED PROPANE PROJECTS, SAYS STUDY

Amid a glut of propane in Alberta that has resulted in negative pricing and with forecast ample supplies, an Edmonton-area business group is pitching the idea of a provincial government incentive for value-added propane projects.

Alberta's Industrial Heartland Association wants to see some of that excess propane converted to much higher value polypropylene before it is exported, Neil Shelly, association executive director, said. "It becomes a business case of do you ship it out raw or do you refine it here."

A report by Stantec commissioned for the association determined that Alberta would gain full-time, stable jobs and an added $65 million annually in government tax revenue from each new industrial facility that adds value to propane.

Williams Energy Canada is building a $900-million propane dehydrogenation project at Redwater that will produce polymer grade propylene beginning in 2017, but two or three Asian firms also are extremely interested in the idea, he said. One or two plants like Williams would consume about 25,000 barrels per day of propane.

"The majority of propane would probably be exported, but we also would have an alternative market internally that we have created, and that helps out if something goes wrong with those export terminals," said Shelly.

OILPATCH EXECUTIVES UPBEAT DESPITE DOWNTURN: STUDY

Despite a downturn that continues to squeeze the oil and gas sector, industry executives are optimistic about the future, a recent survey has found.

Conducted in January and February, the 2015 survey canvassed both producer and oilfield service executives in western Canada about hiring plans, perception of the industry's climate and future expectations, among other topics.

Of the industry's top 50 public companies, nearly half answered the survey by executive recruiter Caldwell Partners, which also canvassed a second group of 150 companies, also publicly held producers or service firms in western Canada. Response rates from the second group weren't available.

Caldwell executives were surprised by the optimism voiced in the survey, especially by the top 50 companies, defined as those whose stocks made the biggest gains in 2014. According to Sean McLean, co-managing partner of Caldwell's Calgary office, the brighter outlook in the top 50 contrasted with the doom and gloom often expressed in the other group.

Since Canada's top 50 includes some of the strongest, best financed upstream companies in North America, he acknowledged the greater optimism shown by their executives should not be too surprising. Yet, even accounting for the strength of those companies, "I thought we'd see a lot more anxiety and concern among the top 50 than we did," he told the *Daily Oil Bulletin*.

Results showed that relatively more of top 50 firms saw the current downturn as an opportunity, compared with the other 150 companies canvassed. Of the top 50 companies responding, 83 per cent agreed somewhat or strongly that the current downturn creates acquisition opportunities, either on the asset or corporate front. In contrast, only half of executives who responded from the group of 150 other companies felt the same way. ■

TECHNOLOGY UPDATE

CARBON CAPTURE AND STORAGE PROJECT CLOSE TO START UP

The countdown is on for the oil sands industry's first carbon capture and storage project, a facility that can process a million tonnes of CO_2 per year, and is expected to start up later this year at Shell Canada's Scotford Upgrader.

Shell Quest project manager Anita Spence led the execution of the project, which was delivered on time and on budget. She says that successful project execution on major projects in Alberta is all about clarity and collaboration.

"Getting alignment between all of the various companies that you enter into relationships with is important, with clear scope and an integrated approach so that everybody has a common understanding of the overall goals of the project," Spence says.

"It is really about collaboration with accountability, and I say that because we can't succeed without our contractors and suppliers succeeding. If there is something that they are having a problem with, our preference is to help versus to throw stones so that we collectively succeed at the end of the day."

COMPANY BRINGS DOWN FRACKING COSTS WITH NEW TECHNIQUE

Yangarra Resources believes its well costs will improve significantly this year thanks to a new process it is using to complete its wells, having moved away from using a ball-drop system and now using cemented liners and a sliding sleeve supplied by NCS Multistage.

"Our drilling costs have come down significantly as a result of that technology, our frac costs have come down significantly, we just need a lot less horsepower at that location and, hard as it is to believe, the productivity of the wells seems to be considerably better," Jim Evaskevich, president and chief executive officer, told the company's annual general meeting. "We're very early in the process, but it appears as though the productivity is going to be significantly enhanced with this new process."

Yangarra estimates the new system provides savings of 15 per cent. The process is less expensive, simpler to run and provides better results. The company is using a slick pipe in the ground so there are no restrictions in its casing, Evaskvich said.

"We're able to, rather than use packers, we now cement the entire string in the ground, which simplifies our drilling process, and then when we go to complete it, we just go in with coil and we're able to just slide the sleeves open as we frac the intervals, but what that does for us is we don't have to use nitrogen pumpers and we don't need nearly as much horsepower on location, so our fracking costs come way down."

NEW TECHNOLOGIES TO RECOVER HEAVY OIL SHOW PROMISE

New technologies are available to cause remarkable, rapid advances in materials sciences, such as surface-coated nanoparticles to help recover heavy oil, says a University of Calgary professor.

University scientists are working on making steam more viscous using particles, stabilizing steam foams and, longer term, delivering heat without steam.

"Things are happening on a very, very small scale to address this very, very large challenge known as the oil sands here in Alberta," says Steven Bryant, the first Canada Excellence Research Chair at the U of C.

Bryant and his colleagues were given $10 million in federal funding over seven years to create the research chair for Materials Engineering for Unconventional Oil Reservoirs.

"We told the federal government who funds these things that we think the time is right to try to take advantage of what's happening in materials engineering, nanoparticles in particular," Bryant told the 2015 SPE Canada Heavy Oil Technical Conference in Calgary.

Nanomaterials are already used in the oil and gas industry in products such as drilling muds, he said. These nanomaterials are helpful in drilling through "shaley" sections because they prevent the aqueous phase from interacting with the shale. ■

LABOUR UPDATE

REDUCED SPENDING COULD RESULT IN 25 PER CENT DECLINE IN ENERGY INDUSTRY JOBS

The Canadian economy could lose up to 185,000 direct and indirect jobs related to the oil and gas industry this year as a result of an anticipated $31-billion reduction in industry capital and operational expenditures in response to low commodity prices, says a new study.

The 25 per cent decline in jobs from 2014 assumes spending patterns would otherwise have remained the same as in previous years, according to the employment impact assessment released in May by the Petroleum Labour Market Information (PetroLMI) division of Enform (formerly the Petroleum Human Resources Council). Last year, the oil and gas industry spent more than $125 billion on exploration, development and production activities in Canada, supporting more than 720,000 direct and indirect jobs, the study notes.

The assessment examines the impacts to both direct jobs, such as geological engineers and plant operators, and indirect jobs, such as drilling contractors and helicopter pilots. It is based on industry expenditure estimates provided by ARC Financial with inputs from the Canadian Association of Petroleum Producers and using Statistics Canada's interprovincial input-output model.

"The industry has already experienced significant impacts to its labour force since the price of oil started its decline last November," said Carol Howes, director of PetroLMI. "If oil prices continue to remain low, we anticipate additional reductions to spending and jobs before things start to turn around."

While the majority of job losses are expected to take place in Alberta, employment impacts would extend across the country. Approximately one-third of jobs could be lost outside of Alberta, with an estimated 20,000 job losses in B.C. and 14,000 job losses estimated in Ontario.

Oil and gas engineering construction firms, which perform the majority of work on development projects, would expect to absorb the largest share of employment impacts, accounting for up to 75,000 jobs. The support services sector, which is involved heavily in exploration and development drilling, would account for the next largest share of potential job losses with an estimated decline of 26,000 jobs.

The estimated employment impacts in this assessment are larger in magnitude but comparable in scale to industry declines reported during the global economic crisis in 2008-09. The most significant spending declines in 2015 are expected in capital expenditures on exploration and development, which are anticipated to decrease by almost $28 billion, down 37 per cent from 2014 but similar to 2009.

Even with Canadian oil production expected to grow modestly in 2015, expenditures related to operations are also projected to decline by almost $3.3 billion, down 6.7 per cent from 2014. After adjusting for inflation, the estimated decline in capital and operational expenditures is almost $10 billion, or 34 per cent, more than in 2009.

"What is clear is that the behaviour of oil and gas companies will be an important factor in determining the actual number of job losses in 2015," said Howes. "Managing labour costs in a time of declining oil prices through creative workforce retention strategies will become more critical in the months ahead."

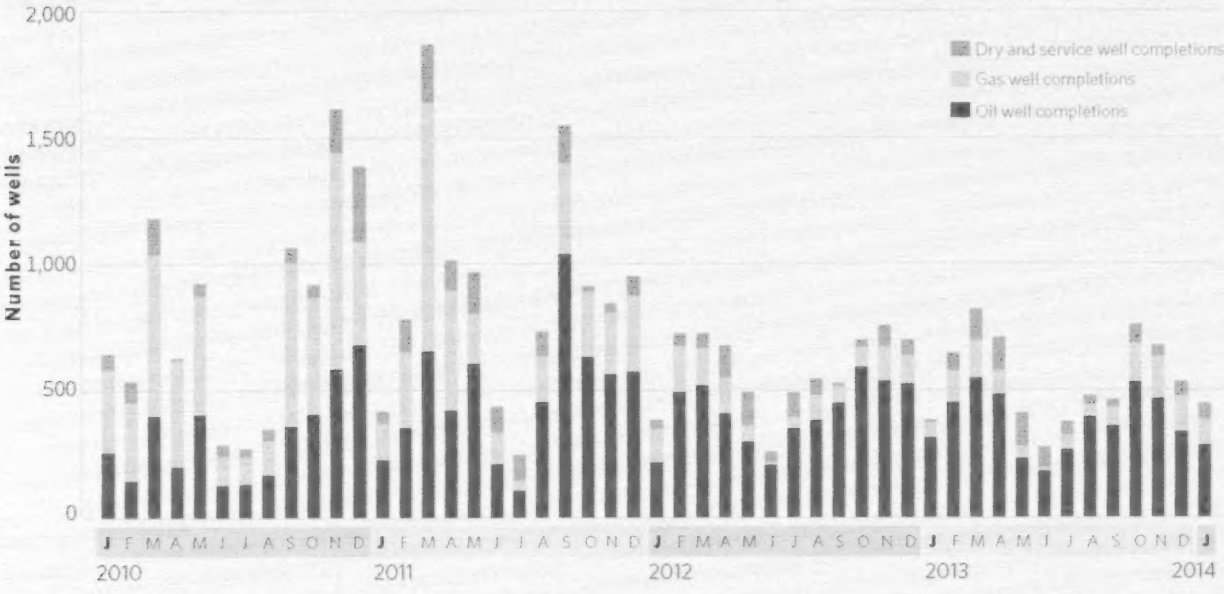
Howes added that the outlook for 2016 and beyond is unclear.

"It really depends on creative efforts to maintain workforces through things like job sharing and salary reductions," she said. "There have been downturns before, but they seem to be more creative this time than they have been in the past. The ability to maintain that, going forward, is really the next step."

The impact on jobs could also be affected by companies' spending decisions and whether they begin to increase activity if they believe prices have stabilized, she said, noting that the forecast was done in January of this year before prices began to rise slightly. ■

OIL & GAS STATISTICS

ALBERTA WELL COMPLETIONS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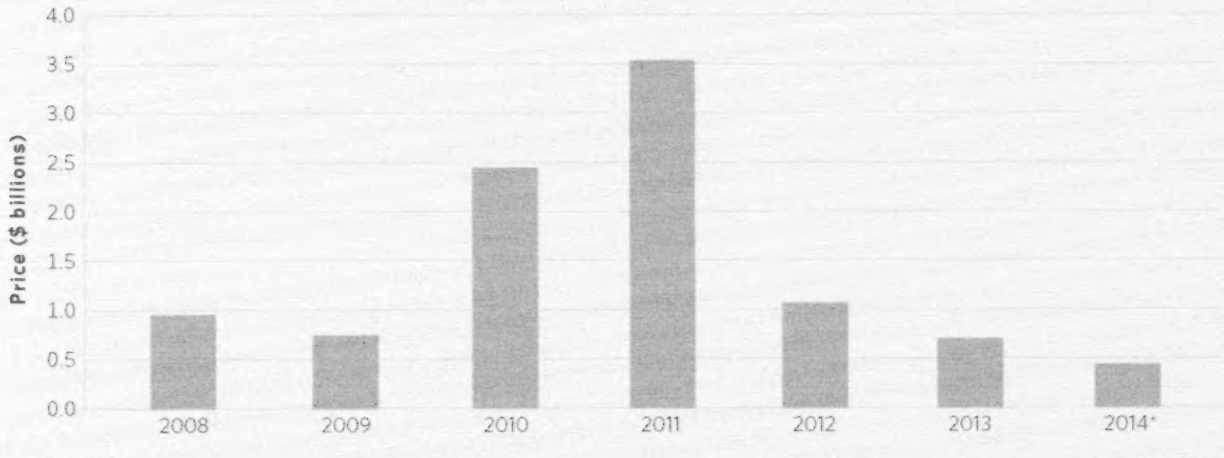
ALBERTA CROWN LAND SALES

Petroleum and natural gas rights, excluding oil sands



STATISTICS CONTINUED

DRILLING RIG COUNT BY PROVINCE/TERRITORY

June 2015

	ACTIVE	DOWN	TOTAL	ACTIVE
Western Canada				(Per cent of total)
Alberta	80	446	526	15
Saskatchewan	40	93	133	30
British Columbia	16	65	81	20
Manitoba	1	13	14	7
WC total	**137**	**617**	**754**	**18**
Eastern Canada				(Per cent of total)
Quebec	0	1	1	0
Canada total	**137**	**618**	**755**	**18**

Source: IHS Markit

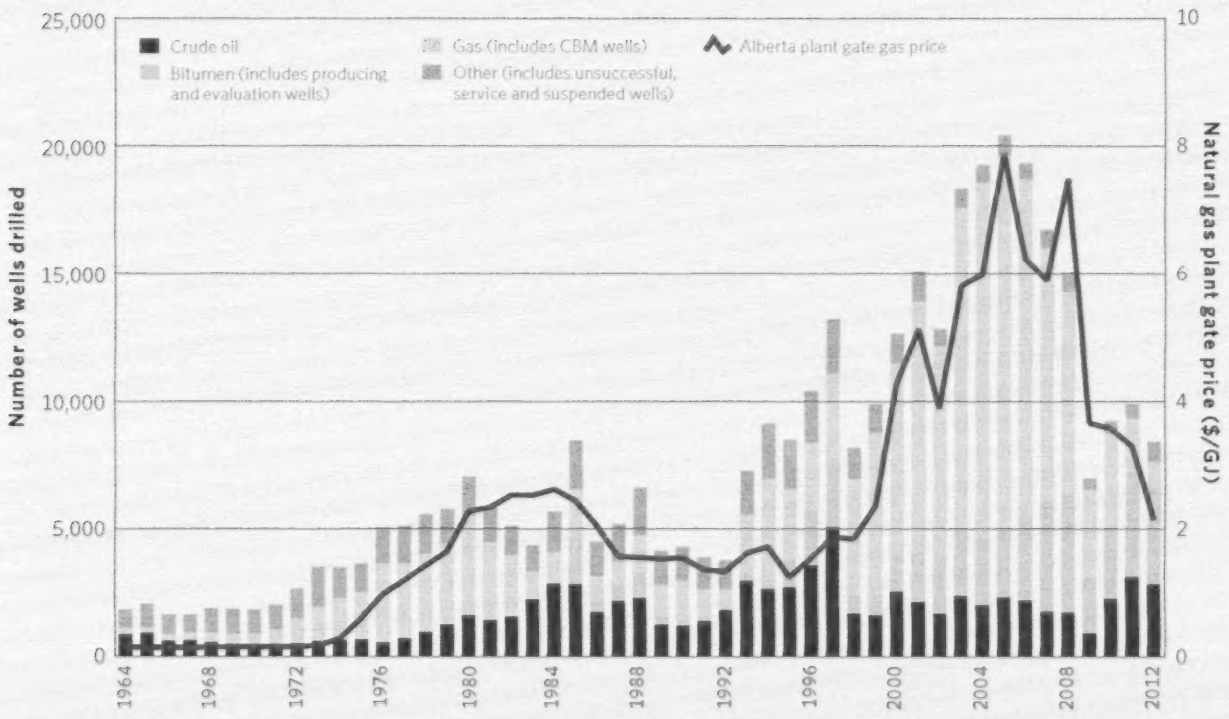
OIL AND GAS WELL COMPLETIONS BY PROVINCE

May 2015

	OIL WELLS		GAS WELLS	
Western Canada	**MAY '14**	**MAY'15**	**MAY'14**	**MAY '15**
Alberta	190	34	52	42
British Columbia	7	2	68	21
Manitoba	0	0	0	0
Saskatchewan	20	23	0	0
Total	**217**	**59**	**120**	**63**

Source: IHS Markit

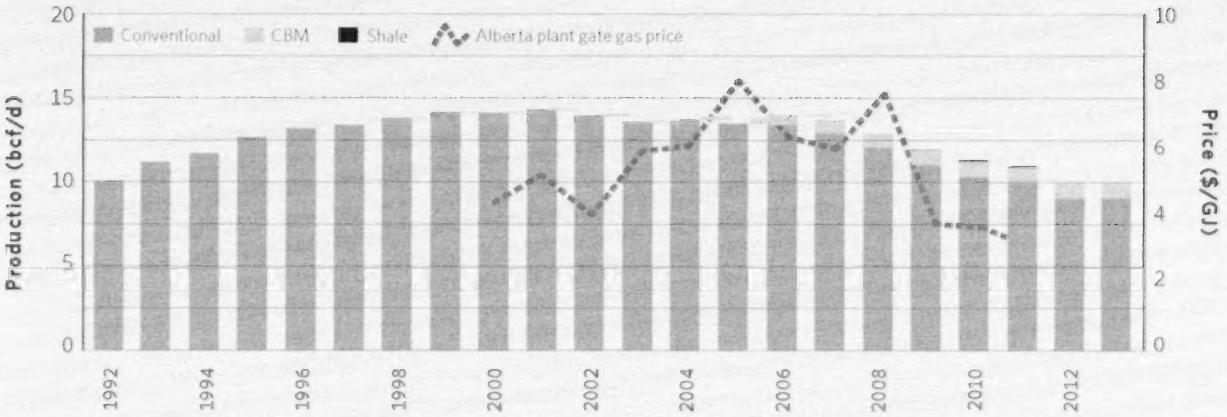
DRILLING ACTIVITY IN ALBERTA, 1964-2012



Source: Alberta Energy Regulator

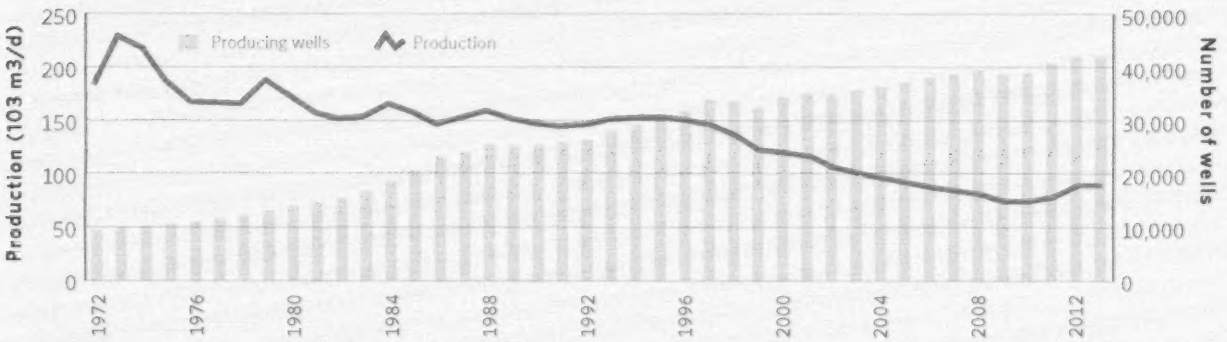
STATISTICS CONTINUED

ALBERTA MARKETABLE GAS PRODUCTION



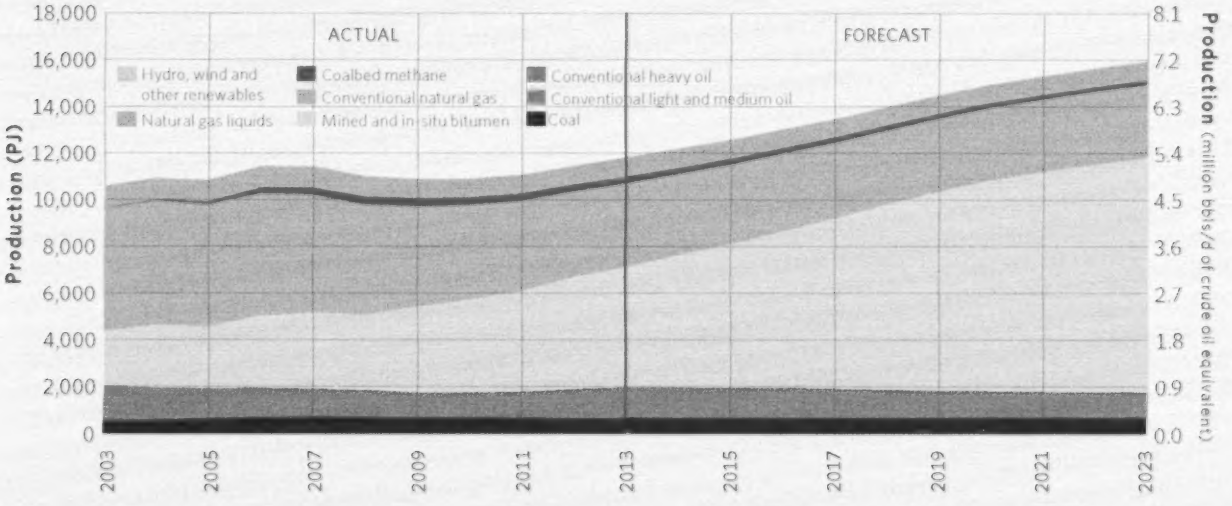
Source: Alberta Energy Regulator

ALBERTA CRUDE OIL PRODUCTION AND PRODUCING WELLS



Source: Alberta Energy Regulator

TOTAL PRIMARY ENERGY PRODUCTION IN ALBERTA



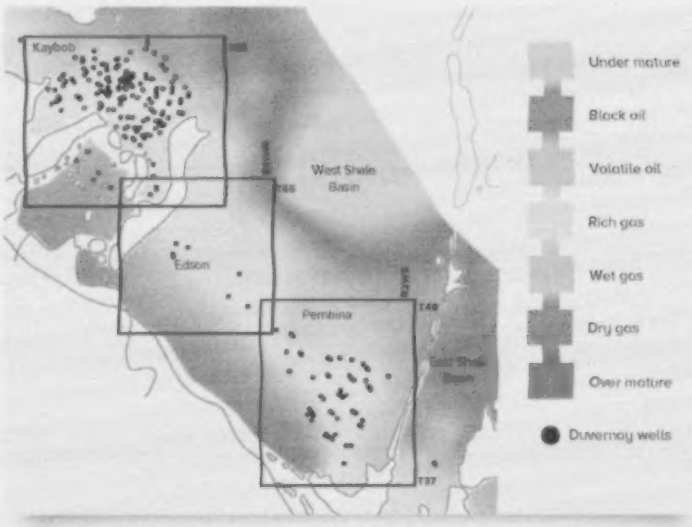
Source: Alberta Energy Regulator

THE DUVERNAY CONTINUES TO EMERGE

In December 2009, the Alberta government's final land sale of the year generated an eye-widening $384.3 million—a bright spot in what had been, to that point, a pedestrian year for provincial Crown auctions.

The Duvernay play in Alberta's Deep Basin was identified as a chief reason for the high bonus bids paid at this sale, and this was merely the opening act—it kicked off an over-two-year boom in Crown land spending. The apex came on June 1, 2011, when Alberta attracted a massive $843.03 million—an all-time high for a single sale—fuelled by the Duvernay.

With most of the prospective land spoken for, the question now is, will the Duvernay fulfill its promise as the next star play of North America, or were those billions in land-acquisition dollars spent in vain?



Duvernay Fairway

According to a November 2013 study by BMO Capital Markets, drilling results over the last 1.5 years have confirmed the existence of multi-phase windows—dry gas, liquids-rich gas, volatile oil and black oil—and the ability of the reservoir to behave as a true, over-pressured shale reservoir and, from most windows, deliver hydrocarbons economically.

The Alberta government's royalty regime favours Duvernay gas wells over Duvernay oil wells, which suggests activity, at least in the near term, will be relegated to defining and drilling in the condensate- and natural gas liquids-rich windows, the study notes.

"It is with this continued investment that the Duvernay shale has emerged as a highly sought-after, world-class unconventional shale play, with a focus now on condensate—the new gold," BMO stated.

EARLY WELL RESULTS

Canadian Discovery identified 59 wells that report production from the Duvernay in Alberta, with 50 of these wells still on stream at Aug. 31, 2013.

The well with the highest oil rate is at that time was a Royal Dutch Shell well in the Kaybob Field at 15-09-063-20W5, which averaged about 200 barrels per day of oil (bbls/d) during that month. The best condensate rate was from an Encana well at 06-09-063-23W5 in the Waskahigan Field, which averaged 480 bbls/d. And the best gas rate came from a Chevron Canada well at Kaybob South 02-16-062-20W5, which averaged about 2.5 million cubic feet per day in August.

It's still too early to declare the play a commercial success, Canadian Discovery admitted, as operators are currently experiencing a range of successes.

"However, indications are that after operators determine the areas with the greatest potential and which completion programs work effectively in those areas, the project costs will come down significantly enough to provide long-term strong economics," the firm said.

FUTURE DEVELOPMENT

Brad Hayes, president of Petrel Robertson Consulting, said that while 2014 was an important year for the Duvernay, he did not characterize it as a pivotal one. Companies will continue to optimize their drilling and completions practices, and some, such as Chevron and Encana, will ramp up development in areas they see as economic.

"The play will progress, but it's unlikely there will be any pivotal events that will suddenly change the course of overall development—we're a few years into it, and there are many more to go," he said. "Duvernay lands in the areas where commerciality is reasonably envisioned—around the liquids-rich part of the fairway—are quite tightly held.

"There are some land opportunities in areas of uncertain economic merit—in the dry gas or oil areas—but there is unlikely to be much more land activity in these areas until their productive and commercial merits are proven up."

BMO said the type well economics show that liquids-rich Duvernay gas wells are profitable and that the condensate has the greatest impact on value. This has led to operators pushing the play boundaries further into the oily phase window in their quest for higher condensate yields. ■

CONDENSATE DEMAND DRIVING DUVERNAY ACTIVITY

For more on the Duvernay, see the *Daily Oil Bulletin's special digital magazine* of the play.

Alberta's Duvernay shale may see limited near-term development for natural gas liquids (NGLs), but oil economics are currently challenged by low crude prices and cheaper sources such as the Cardium, a conference heard in late May.

Large-scale development of Duvernay natural gas is years away as the emerging play will have to compete with gas from cheaper sources such as the Montney, said Bruce Peachey of New Paradigm Engineering.

Peachey is currently doing a study on the Duvernay for Petroleum Technology Alliance Canada (PTAC). The Alberta government contracted PTAC to compile data to help small- and medium-size businesses identify opportunities and plan their growth accordingly.

PTAC's completed forecast for Cardium oil activity, and some findings of the Duvernay study, which isn't completed yet, were presented at PTAC's annual Hydraulic Fracturing Forum in Calgary in May.

Duvernay wells can cost anywhere between $11 million and $20 million or even more, depending on the location. Many are exploration wells, and hence can't take advantage of the economies of scale that come with full-field development.

The formation is very thick—up to 400 metres in some areas—and very deep.

"It's mainly gas, but there are some [NGLs]-rich areas, and those are the areas people are focusing on right now," Peachey said. "There are some oil areas as well, but not too many people would be going after the oil because it's very expensive oil compared to the Cardium or other places where you could drill.

"We may see limited development in the near term for [NGLs] for condensate. That seems to be more economic, mainly because it's part of the oil sands economics," he told the conference.

"The Duvernay is really being driven right now by condensate for the oil sands," Peachey said.

TRILOGY'S DUVERNAY PROGRAM MOVES FORWARD

Alberta-based Trilogy Energy has spent about $300 million in preserving and learning about its Duvernay land base, which includes 200 sections of land in what it thinks is the sweet spot of the fairway at Kaybob.

"But we have created about $400 [million to] $500 million of proved-plus-probable reserve value out of that $300 million, so we're quite happy with that," Jim Riddell, chief executive officer, told the company's recent annual general meeting.

The company has 75 sections in the condensate-gas window on the south part of the play. It also has 125 sections in the oilier, or condensate-rich part of the Duvernay to the north.

At South Kaybob, in the gas condensate part of the play, the company's first well has been on-stream for almost four years. The well has already produced 1.5 billion cubic feet (bcf) of gas on its way to what Trilogy believes will be four bcf of production. The well has produced 145,000 barrels of condensate to date.

Riddell says the well produces a "very consistent" 100 barrels of condensate per million cubic feet (mmcf) of gas produced.

On the north side of the play—the condensate-rich and oil part of the play—the company's most recent well drilled has been on production for about a year. It has produced 0.4 bcf of gas, but it's already produced 132,000 barrels of condensate.

Riddell said this northern well produces a fairly constant 300 barrels of condensate per mmcf per day.

"So, in comparison to [the South Kaybob well] I showed you before, it's taken almost four years to produce the same amount of condensate. That's really the driver of the value out of these wells," he said, noting that oil is becoming an increasingly higher proportion of the production mix.

Peak volumes from the Duvernay play reached about 5,000 barrels of oil equivalent per day (boe/d), but with the lack of spending in the last six to nine months, that has dropped to the current rate of 3,500 boe/d, Riddell said. ■

CONTACTS

INDUSTRY ASSOCIATIONS

Alberta Land Surveyors' Association www.alsa.ab.ca
Canadian Association of Geophysical Contractors www.cagc.ca
Canadian Association of Oilwell Drilling Contractors www.caodc.ca
Canadian Association of Petroleum Producers www.capp.ca
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